This listing of claims will replace all prior versions, and listings, of claims in the application:

## **LISTING OF CLAIMS**

- 1. (Currently amended) A slide drive device for a press machine, comprising:
- a slide;
- said slide including a top and a bottom dead center position;
- a single adjusting means for permitting an adjustment of a stroke of said slide; and
- said adjusting means simultaneously adjusting said top and bottom dead center positions by a same amount.
  - 2. (Previously amended) A slide drive device, according to claim 1, further comprising:
  - a driving means for driving of said slide drive device;
  - at least a first upper link;
  - said first upper link being connected to drive said slide in a cycle;
- said driving means transmitting a driving displacement to said first upper link to drive said slide in said cycle; and
- said means for driving transmitting said adjustment to said slide whereby said stroke is adjusted.
  - 3. (Original) A slide drive device, according to claim 2, further comprising:
- dynamically balancing means for permitting dynamic balancing of said slide drive device;
  - a dynamic balancer operably connected to said slide;
  - said dynamically balancing means connected to said dynamic balancer;
- said dynamically balancing means being operably connected to move said dynamic balancer opposite said slide in said cycle;
- said means for driving connected to transmit said driving displacement to said dynamically balancing means; and

Docket No.: 09637/000L310-US0

Application No.: 09/910,457

3

said dynamically balancing means moving said dynamic balancer opposite said slide in said cycle whereby said dynamic balancer operates to dampen vibration from said slide.

4. (Original) A slide drive device, according to claim 3, further comprising: guiding means for guiding of said slide drive device; at least a first horizontal link; said first horizontal link operably connecting to said slide; said guiding means guiding said first horizontal link in said cycle; said driving means including said guiding means; and

said guiding means guiding said adjustment and said driving displacement to said slide whereby said stroke is adjusted.

5. (Currently amended) A slide drive device, according to claim 4, further comprising: a crankshaft;

first and second connecting rods on said crankshaft;

said <u>first and said second</u> connecting <u>rod rods</u> receiving a reciprocating motion and transmitting said reciprocating motion to said means for driving;

said <u>first and said second</u> connecting <u>rod</u> and said means for driving being effective to transmit said reciprocating motion to said dynamically balancing means; and

said guiding means being effective to convert said reciprocating motion to a guiding displacement, whereby said slide operates in said cycle.

6. (Previously amended) A slide drive device, according to claim 5, further comprising: said at least first upper link having a first length (a);

at least a first middle link;

a center fulcrum pin on said first middle link;

said first upper link operably connecting to said first middle link at said center fulcrum pin;

a first and second end on said first middle link;

4

said first connecting rod operably coupled to said second end;

said first middle link comprising a second length (b) measured between said first end and said center fulcrum pin, and a third length (c) measured between said second end and said center fulcrum pin; and

said first, second, and third lengths having the following relationship:

$$(a):(b) = (b):(c)$$
 (V)

whereby said first connecting rod transmits said driving displacement to said first upper link and said first middle link and driving means reduces a slide speed adjacent said bottom dead center position and increases said slide speed distal said bottom dead center position.

7. (Previously amended) A slide drive device for a press machine having a slide, comprising:

a slide;

said slide having a top and a bottom dead center position;

a single adjusting means for adjusting a stroke of said slide;

said adjusting means simultaneously adjusting said top and bottom dead center positions by a same amount;

a driving means for permitting driving of said slide drive device;

at least a first upper link;

said first upper link being connected to drive said slide in a cycle;

said driving means transmitting a driving displacement to said slide to drive said slide in said cycle; and

said driving means transmitting said adjustment to said slide whereby said stroke is adjusted.

8. (Currently amended) A slide drive device, according to claim 7, further comprising:

a guiding means for guiding of said slide drive device;

at least a first horizontal link;

first and a second linear guides guide;

## first and a second sliders slider;

said second slider operably slidable in said second linear guide;
said one horizontal link operably joined to said second slider;
said second slider receiving said driving displacement from said driving means;
said guiding means being effective to guide said adjustment to said slide;
said guiding means transferring a guiding displacement to said slide; and
said first horizontal link driving said slide in said cycle whereby said stroke is adjusted
and said top and bottom dead center positions are adjusted by the same amount.

9. (Original) A slide drive device, according to claim 8, further comprising: dynamically balancing means permitting dynamic balancing of said slide drive device; said dynamically balancing means connecting a dynamic balancer to said slide; said dynamically balancing means connects to operate said dynamic balancer opposite said slide;

said dynamically balancing means receiving said guiding displacement; and said dynamically balancing means being effective to operate said dynamic balancer opposite said slide whereby said dynamically balancing means and said dynamic balancer counter a momentive force of said slide in said cycle and substantially lower vibration in said slide drive device.

10. (Currently amended) A slide drive device, according to claim 9, further comprising: a crankshaft;

first and second connecting rods on said crankshaft;
a center of said crankshaft vertically aligned with said second slider;
at least one of a first and second eccentric part on said crankshaft;
said first and second eccentric parts diametrically opposed on said crankshaft;
said first and second eccentric parts balanced about a rotation center of said crankshaft;
said at least one first connecting rod on said one first eccentric part;
said second connecting rod on said second eccentric part;

6

said <u>first and second</u> connecting <u>rod</u> <u>rods</u> receiving a reciprocating motion and transmitting said reciprocating motion to said driving means;

said driving means being effective to transmit said reciprocating motion to said dynamically balancing means; and

a guiding means being effective to convert said reciprocating motion to a <u>said</u> guiding displacement, whereby said slide operates in said cycle.

11. (Currently amended) A slide drive device, according to claim 10, further comprising:

a small and a large end on said one first connecting rod;

said large end operably attached to said one first eccentric part;

said small end operably attached to said driving means; and

said small end reciprocating linearly to a rotation center of said erank shaft crankshaft whereby said driving displacement is transmitted to said slide.

12. (Currently amended) A slide drive device, according to claim 11, further comprising:

at least a first upper link;

said first upper link operable about a fixed fulcrum pin;

said at least one upper link having a first length (a);

at least a first middle link;

a center fulcrum pin on said first middle link;

said first upper link pivotably joined to said one first middle link at said center fulcrum pin;

a first and second end on said one first middle link;

said one first connecting rod operably coupled to said second end;

said one <u>first</u> middle link comprising a second length (b) measured between said first end and said center fulcrum pin, and a third length (c) measured between said second end and said center fulcrum pin; and

said first, second, and third lengths having the following relationship:

$$(a):(b) = (b):(c)$$
 (VI)

Docket No.: 09637/000L310-US0 ·

Application No.: 09/910,457

7

whereby said one <u>first</u> connecting rod transmits said driving displacement to said first upper link and said first middle link and said driving means drives said slide in said cycle and reduces a slide speed adjacent said bottom dead center position and increases said slide speed distal said bottom dead center position.

13. (Currently amended) A slide drive device, according to claim 12, further comprising:

a guide pin;

said guide pin guiding said dynamic balancer opposite said slide;

a balancer pin;

said balancer pin operably joined to said dynamic balancer;

a balancer link;

said balancer link operably joining said balancer pin to said one first connecting rod;

said balancer link receiving said driving displacement and transmitting said guiding displacement to said dynamic balancer whereby said dynamic balancer operates opposite said slide and substantially eliminates vibration; and

said dynamic balancing means having a shape adapted to said driving means whereby said slide drive device is compact in size.

14. (Original) A slide drive device, according to claim 13, wherein: said balancer pin is vertically aligned with said fixed fulcrum pin.

15. (Currently amended) A slide drive device, according to claim 14, further comprising:

a first linear guide;

said first linear guide vertically aligned with said fixed fulcrum pin and said balancer pin;

a first slider operably slidable in said first linear guide;

said first end of said one first middle link operably joined to said first slider;

said one <u>first</u> middle link operably transmitting said driving displacement from said one <u>first</u> connecting <u>link</u> <u>rod</u> to said first slider;

at least one of a first and second lower link;

a first and second side on said one horizontal link;

said first side operably joined to said second slider;

said second side operably joined to said one lower link;

said one lower link operably joining said first slider and said one horizontal link; and

said first slider being effective to convert said driving displacement to a linear displacement whereby said one lower link operably drives said one horizontal link and said slide in said cycle.

- 16. (Previously amended) A slide drive device, for a press machine having a slide, comprising:
  - a single means for adjusting said slide drive device;
  - a crankshaft;
  - a first eccentric part on said crankshaft;
  - a second eccentric part on said crankshaft;
- said first and second eccentric parts operably opposing each other about a rotation center of said crankshaft;
  - a first and second connecting rod;
  - said connecting rods operably joined to said eccentric parts;
  - said connecting rods receiving a driving displacement from said crankshaft;
  - a first and second upper link;
  - said upper links operable about a fixed fulcrum pin;
  - a first and second middle link;
  - said middle links having first and second ends;
- said connecting rods effective to transfer said driving displacement to said middle links at said second ends;

said upper links operably joined to said middle link at a center fulcrum point between said first and second ends;

said middle links effective to transfer said driving displacement to said upper links;

9

said middle links and said upper links operably effective to transfer said driving displacement to a slide and drive said slide in a cycle;

said connecting rods having a length (a);

said center fulcrum point located a length (c) from said second end;

said center fulcrum point located a length (b) from said first end; and

said lengths (a), (b), (c), having the following relationship:

$$(a):(b)=(b):(c)$$
 (VII)

whereby said connecting rods operate horizontally to said crankshaft and said upper links and said middle links are effective to transfer said driving displacement to said slide and drive said slide in said cycle at a low speed adjacent said bottom dead center for increased force and a fast speed distal said bottom dead center for a speedier return.

17. (Previously amended) A slide drive device, according to claim 16, further comprising:

a top and a bottom dead center position of said slide;

said adjusting means permitting adjustment of a stroke of said slide;

said adjusting means permitting adjustment of said top and bottom dead center position at the same time;

said adjusting means permitting said adjustment of said top and bottom dead center positions by the same amount;

at least one of a first and second horizontal link;

a first and second end on said one horizontal link;

said one horizontal link effective to receive said driving displacement at said second end;

said one horizontal link effective to receive said adjustment at said first end; and

said one horizontal link effective to transfer said driving displacement and said adjustment to said slide whereby said slide is adjusted and driven in said cycle.

18. (Original) A slide drive device, according to claim 17, further comprising: means for dynamically balancing said slide drive device;

Docket No.: 09637/000L310-US0

Application No.: 09/910,457

10

said dynamic balancing means operably moving a dynamic balancer opposite said slide in said cycle;

a guide pin operably guiding said dynamic balancer during said cycle; said guide pin vertically aligned with said fixed fulcrum pin; said dynamic balancing means driven by said one connecting rod; and

said dynamic balancing means being effective to counter a momentive force of said slide and said one connecting rod whereby said slide operates in said cycle with substantially lower vibration.